NAVY PUBLIC WORKS CENTER
NORFOLK, VIRGINIA

UTILITIES DEPARTMENT

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE

SWITCHOUT AND SWITCHBACK ENERGIZED CIRCUIT

PROCEDURE NUMBER

WC 622 HVE 007

DISTR:
601A
610
620
WC 622
WC 624

SIGNED:_____
(DATE)

APPROVED:_____
(DATE)

SAFETY PROFESSIONAL:_____
(DATE)

MANAGEMENT OFFICIAL:_____
(DATE)

DATE:_____ **REVISION DATE:**_____

Purpose:
Procedure to switchout an energized circuit and to switchback the deenergized circuit.

Potential Energy Sources:
1. 34.5 kv equipment and cables.
2. 11.5 kv equipment and cables.
3. 4.16 kv equipment and cables.
4. 480 volt and below equipment and cables.

Tools and PPE:
Tools: shotgun stick, hot sticks and ground cables. PPE: Nomex coveralls, Nomex hood, insulating rubber gloves, insulating rubber sleeves, hard hat, safety shoes, safety glasses. The class of rubber gloves and sleeves will depend on the exposure voltage as per the following: Class 0 - up to 1,000 volts, Class 1 - up to 7,500 volts, Class 2 - up to 17,000 volts, Class 3 - up to 26,500 volts, Class 4 - up to 36,000 volts.

References:
1. PWC Occupational Safety and Health Program Manual, PWCNORVAINST 5100.33E
2. Occupational Safety and Health Standards for General Industry (29 CFR PART 1910): Subpart I, Personnel Protective Equipment; Subpart R, Electrical Power Generation / Transmission / Distribution; Subpart S, Electrical
3. NFPA 70 E, Approach Distances To Exposed Energized Electrical Conductors and Circuit Parts
4. ANSI C2-1987, National Electrical Safety Code
5. Electrical Transmission and Distribution Safety Manual, NAVFAC P-1060
6. US Corps of Engineers Safety and Health Requirements Manual
7. PWC, Code 600, Lockout and Tagout Procedure
8. PWC SOP# 600 HVE 6, PWC Switching or Breaker Operation

Procedures:

1. Open all switches, fuse cutouts and breakers which are sources of power to the circuit being switched out. Follow the Switching Order procedure developed as per Code 600's Lockout and Tagout Procedure. Have a system one line available for reference. Refer to SOP# 600 HVE 6, PWC Switching or Breaker Operation for procedure to open the switches or breakers. Maintain constant radio

communication with the operations control personnel. If there are any discrepancies

between actual switch positions and the switch positions noted in the switching procedure, stop the process and contact the foreman, general foreman, or director, in order to receive directions on how to proceed. Follow Code 600's Lockout and Tagout Procedure to lock and tag all switches and breakers opened.

2. Test circuit to verify it has been deenergized. Before the circuit conductors are checked, test the high voltage tester on a known energized circuit to verify the tester is working. Test each deenergized circuit conductors separately, taking care not to cross phase during test. If voltage is detected, stop the test. If no voltage is indicated, retest the high voltage tester to re-verify it is working properly. Wear listed PPE to test the circuit.

3. Attach grounds onto the circuit. Each circuit conductor will be grounded. To attach grounds, first connect one ground cable end to station ground, or a grounded structure, then attach the other end to a fiberglass shotgun stick. Using the shotgun stick bleed off any static build up on the circuit conductor. Once the static has been bled off, attach the ground cable to the circuit conductor using the shotgun stick. Repeat for each phase. Follow Code 600's Lockout and Tagout Procedure concerning ground tags. Wear listed PPE to attach the grounds.

4. After the necessary work has been complete, and after it has been verified all workers are off the circuit per Code 600's Lockout and Tagout Procedure, remove the grounds attached to the circuit.
Procedure to remove grounds is as follows:
(a). Test that the circuit is still deenergized using a high voltage tester. Before the circuit conductors are checked, test the high voltage tester on a circuit of the same voltage to verify the tester is working. Test each deenergized circuit conductors separately, taking care not to cross phase during test. If voltage is detected, stop the test. If no voltage is indicated, retest the high voltage tester to re-verify it is working properly. After the circuit has been verified dead, remove the grounds using a fiberglass shotgun stick. Remove the ground cable end attached to the circuit conductor first, then remove the end attached to station ground, or a grounded structure. Wear listed PPE.

5. Remove all locks and tags as per Code 600's Lockout and Tagout Procedure. Following SOP# 600 HVE 6, PWC Switching or Breaker Operation, reclose all switches and breakers as per the Switching Order

package. Maintain constant radio communication with the operations control personnel.

END